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The Impact of Trade Liberalisation on Economic Growth in Switzerland

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ABSTRACT

The objective of this study is to analyse the effect of trade liberalization on economic growth in Switzerland using annual data from 1990 to 2014. In doing so, the study incorporated Foreign Direct Investment (FDI) and the Employment Rate (EMP) as additional variable to form a multivariate framework. The Auto-Regressive Distributive Lag (ARDL) test was used to test the existence of a long run relationship among the variables. The empirical findings indicated that Trade Openness had a positive and significant effect on economic growth in Switzerland. Thus, the study recommend that there is a need for the country to put strong initiative on adding value on her exports so as to compensate for imports.

Keywords: Trade liberalisation, Economic growth, Auto-regression Distribution Lag Model (ARDL), Co-integration, Switzerland.

1. INTRODUCTION

There has been considerable interests and debates on the degree of influence that international trade exerts on economic growth over the past decades. International markets have gone through a whole paradigm shift as new concepts like globalization have taken root and have encouraged trade liberalization. An increase in interconnectedness has encouraged the sharing of efficient production ideas and new advanced technology. Building on this theoretical foundation, a number of empirical studies examined the relationship between trade openness

and economic growth. The results of most these studies indicate that trade openness exposes domestic markets to global markets in which they can trade goods and services without any rigid restrictions furthermore promoting growth (Khobai et.al 2018; Hozouri 2016, Umer 2014 and Manni et.al 2012).

This study purposes to contribute to the existing studies by investigating the case of Switzerland using the autoregressive distributed lag (ARDL) approach to cointegration. The country was chosen because it has a competitive economy and its GDP per capita is amongst the highest in the world. The country was ranked third-largest in the world and seventh largest after adjusting for purchasing power (FDEA, 2010). The country is strongly geared towards exports as a percentage of GDP and its foreign trade is among the highest in the world. It managed to bounce back from the 2008 recession because it implemented an export-led strategy and the overall performance of GDP per capita is above average according to the OECD standard (OECD, 2015). Any positive or negative shock to global world has direct effect on international trade such as global financial crisis 2008 which adversely affected the world trade and GDP growth due to the integration of world economy. These crises opened a new debate to check the connection between trade liberalization and growth.

Switzerland is integrated into a global economy to an exceedingly high degree thus making foreign trade an important growth driver for Swiss economy. Brandes et.al (2009) mentioned that foreign trade contributed about 0, 48% to the average GDP growth of 1, 5% in which the contribution made by exports amounted to a substantial 1, 94%. The economy is more reliant on export-led growth hence the import requirement in the Swiss industry is due to the fact that there is lack of raw materials because of its geographical and climate restriction (Stern, 2009). Stern (2009) claimed that this dependency on foreign trade is the reason why Swiss trading policies are extremely liberal and are committed to free trade policy in theory and practice. It can be argued that the relative strength of Swiss exports has led to the growth of the economy. Brandes et.al (2009) mentioned that Swiss foreign trade is relatively well-positioned and about 50% of the exports come from sectors which have comparative advantage. This is good for the country because it ensures that resources are used efficiently and thus increasing productivity which results in growth. The findings of this study would be of interest to the policy makers, government and researchers seeking to understand the importance of trade openness in Switzerland.

The remainder of this article is structured as follows: Section two presents the review of the empirical studies. Section three describes the data and empirical methodology employed in the study. Section four presents the analyses of data and discussion of the findings followed by the conclusion and policy recommendations in Section five

2. LITERATURE REVIEW

There is a large body of literature done on the relationship between economic growth and trade openness. The debate around trade liberalisation – growth nexus is centred around the fact that openness to trade is a vital element of successful growth strategies, whereby the signing of unilateral and bilateral agreements allows sectors to freely compete on global markets and thus increases GDP per capita (Kalu et.al (2016). In spite of a vast literature on the matter, the effect of trade openness on economic growth remains controversial. Manni et.al (2012) undertook a single-country study to examine the relationship between trade liberalisation and economic growth in Bangladesh for the period between 1980 and 2010. Their findings from the Ordinary Least Square (OLS) regression technique confirmed a positive and significant relationship between openness and growth.

Yusuf et.al (2013) who employed an autoregressive distributed lag (ARDL) model also carried a single-country study. Their finding revealed that trade liberalisation does not reduce poverty in Nigeria. Another Nigerian study was conducted by Nurudeen et.al (2012) covering the period between 1970 and 2008. This study included human capital development, infrastructural development, international capital inflows and debt services as additional variables. The results posited that trade openness has a negative and a significant effect on economic growth.

Kalu et.al (2016) served to determine the impact of trade openness on economic growth in Nigeria for the period 1991 - 2013. In employing the classical linear regression model (CLRM), the study established that export has a positive and significant effect on economic growth while import had a positive but non-significant effect. Another Nigerian study was undertaken by Olufemi (2004) and indicated that there is a unidirectional linkage between trade openness and economic growth. This implies that economic growth in Nigeria depends on trade openness.

Umer (2014) also applied an autoregressive distributed lag (ARDL) approach to cointegration for Pakistan and established that trade liberalization policies play a key role to enhance economic growth. Sikwila et.al (2014) served to investigate the effect of trade openness on economic growth in South Africa. This study confirmed that trade openness has a significant effect on economic growth both in the long run and short run.

Silva et.al (2013) attempted to determine the relationship between trade liberalization and economic growth in Sri Lanka over the period 1960-2010. The results showed that trade openness has no significant impact on economic growth although they are positively related to economic growth. Rahimi and Shahabadi (2011) conducted a research on Iran in which they investigated the effect of trade liberalization on the economy during the period 1980 to 2006. The findings from the ARDL technique trade liberalisation and economic growth are cointegrated and trade liberalisation had a positive and significant effect on economic growth.

Keho and Wang (2017) investigated the linkage between trade openness and economic growth in Cote D'Ivoire covering the period from 1965 to 2014. Employing the ARDL bounds test and the Toda and Yamamoto Granger causality test, the study revealed that trade openness has a positive short run and long run effect on economic growth. Hye and Lau (2011) focused on India using ARDL model and rolling window regression method. The study affirmed that trade openness negatively affect economic growth in the long run but positively affect economic growth in the short run

The studies that focused on multiple countries included Hozouri (2016) and Khobai et.al (2018). Khobai et al (2018) focused on Nigeria and Ghana and established that trade openness has a positive and significant effect on economic growth in Ghana but a negative and insignificant effect on economic growth in Nigeria. Hozouri (2016) focused on the 17 MENA countries and posited that there is a positive relationship between economic growth and trade openness.

3. METHODOLOGY

3.1 Model Specification

The aim of the study is to evaluate the impact of trade liberalization on economic growth in Switzerland. In doing so, the model incorporated employment and FDI as additional variables. The primary model showing the casual relationship among economic growth, employment, trade openness and foreign direct investment in Switzerland can be written as:

$$GDP = f(EMP, TOP, FDI) \quad 3.1$$

The function can also be represented in an econometric format thus:

$$GPD = \beta_o + \beta_1(EMP) + \beta_2(TOP) + \beta_3(FDI) + \varepsilon_t \quad 3.2$$

Where:

GDP: is the growth rate of Gross Domestic Product

EMP: shows the percentage of the labour force that is employed

TOP: is trade openness equal to the sum of imports and exports ($EX + IM$)

FDI: it shows the net inflows of inward direct investment that are made by investors

β_0 : is the constant term, t is the time trend, ε is the error term

From the literature it has been realised that different authors observed that there is a positive relationship between trade openness, foreign direct investment, employment and real GDP. However there are other factors that may influence this relationship. The theoretical literature deduced that trade liberalization impacts a country's economic growth to a greater extent although macroeconomic policies of a country play a major role. The theory showed that for a country to benefit from trade liberalization depends on factors such as whether a country uses export-led strategy, if it is labour or capital intensive, if it has a skilled workforce or not, the extent in which the labour force is skilled or experienced to use new technology. These are some of the factors that need to be accounted for when considering the effect of trade openness to a country's economic growth.

Factors such as employment and FDI also play a crucial part in influencing economic growth. The theoretical analysis suggested that the two factors are positively related in the sense that FDI influences employment through creating jobs and providing firms with funds necessary for expansion. This contributes to economic growth because as productivity and efficiency increase the level of GDP will also increase

3.2 Data Analysis

3.2.1 Unit root test

Unit root (which is also called a unit root process or a difference stationarity process) is a stochastic trend in time series, sometimes called a 'random walk with drift' and if a time series has a unit root, it shows a systematic pattern that is unpredictable. This implies that when there is a unit root, the variables are non-stationary and future predictions cannot be made. Furthermore, when there is no unit root, it means the variables are stationary and future predictions can be made. To be able to deduce this, this study will employ the Augmented Dicker Fuller test (ADF) and the Phillips-Perron to determine unit root.

The Augmented Dicky-Fuller (ADF) test was employed to check the stationarity of the variables. ADF is a unit root test that reports the correlation between error terms and includes the lag value of the dependent variable in the regression. The optimal lag length was determined by the;

- AIC (Akaike Information Criteria) and the
- SBC (Schwarz Bayesian Criterion)

The ADF test is based on estimating the test regression:

$$\Delta Y = \beta' D_t + \pi Y_{t-1} + \sum_{j=1}^p \phi \Delta Y_{t-j} + \varepsilon_t \quad (3.3)$$

Where $\pi = \phi - 1$, under null hypothesis Δy_t is $I(0)$ which implies that $\pi = 0$, D is a vector of deterministic terms (constant, trend), p lagged difference terms, Δy_{t-j} , are used to approximate the ARMA structure of the errors, and the value of p is set so that the error ε_t is serially uncorrelated. The error term is also assumed to be homoskedastic.

This study will also apply the Phillips Perron (PP) test. The PP test in non-parametric method to test unit root and it is similar to the ADF. Phillips and Perron (1988) developed the Phillips-Perron (PP) test, which is similar to the ADF test. The difference between the PP and ADF is that ADF corrects for auto-correlation by adding lagged values of the dependent variable. The PP test accounts for autocorrelation by making a correction to the t-statistic of γ from the AR (1) regression. The PP test regression is given by Phillips and Perron (1988) as:

$$\Delta Y_t = \beta' D_t + \pi y_{t-1} + \mu_t \quad (3.4)$$

Where μ_t is $I(0)$ and maybe heteroskedastic. The PP tests correct for any serial correlation and heteroscedasticity in the error u_t of the test regression.

3.2.2 The Autoregressive-Distributed Lag (Ardl) Model

This study applies the Autoregressive-Distributed Lag (ARDL) bounds test approach based on the ordinary least square (OLS) estimation of a conditional unrestricted error correction model (UECM) for cointegration analysis developed by Pesaran et.al (2001). It is used here to test for the existence of a long run relationship as well as to make an estimation of long and short run coefficients for the study..

The study uses the ARDL Bounds test because of the several advantages listed below by Nkoro and Uko (2016):

- Firstly, the ARDL efficiently determines the co-integrating relation in small sample cases hence it can be applied to studies that have a small sample size.
- The ARDL technique is assumed to be endogenous meaning that it is free of residual correlation because each of the underlying variables stands as a single equation and therefore endogeneity becomes less of a problem.
- In a long run relationship the ARDL procedure can distinguish between dependent and explanatory variables. That is, the ARDL approach assumes that only a single reduced form equation relationship exists between the dependent variable and the exogenous variables (Pesaran et al, 2001).
- The Error Correction Model (ECM) can be derived from ARDL model through a simple linear transformation, which integrates short run adjustments with long run equilibrium without losing long run information. The associated ECM model takes a sufficient number of lags to capture the data generating process in general to specific modelling frameworks.

ARDL bounds test approach is used to form the existence of long-run and short-run relationships (Nkero and Uko 2016). Thus making it extremely useful because it allows one to describe the existence of an equilibrium relationship in terms of long-run and short-run dynamics without losing long-run information. The ARDL approach consists of the following equation:

$$\Delta GDP_t = \alpha_0 + \sum_{i=0}^p \delta_i \Delta GDP_{t-i} + \sum_{i=0}^q \varphi_i \Delta EMP_{t-i} + \sum_{i=0}^r \gamma_i \Delta TOP_{t-i} + \sum_{i=0}^s \beta_i \Delta FDI_{t-i} + \delta_1 GDP_{t-1} + \delta_2 EMP_{t-1} + \delta_3 TOP_{t-1} + \delta_4 FDI_{t-1} \varepsilon_i \quad (3.4)$$

The first part of the equation with δ_i , φ_i , γ_i and β_i represent the short run dynamics of the model and parameters δ_1 , δ_2 , δ_3 and δ_4 represent the long run relationship. The null hypothesis of the model is,

$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$ (there is no long-run relationship)

$H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$

The ARDL procedure starts by conducting the bound test for the null hypothesis of no cointegration. Khobai et.al (2016) mentioned that two sets of critical values for a given level

of significance are specified whereby there is the calculated F-statistic which is compared with the critical value tabulated by Narayan and Smyth (2005). If the test statistics exceed the upper critical value, the null hypothesis of no long-run relationship can be rejected, regardless of whether the underplaying order of integration of the variables is zero or one. Similarly, if the test statistics fall below a lower critical value, the null hypothesis is not rejected. When the order of integration of the variables is known and all the variables are I (1), the decision is made on the upper bound. Similarly, if all the variables are I (0), then the decision is made based on the lower bound. In the second step, if there is evidence of a long-run relationship (cointegration) among the variables, the following long-run model is estimated:

$$GDP = \alpha_1 + \sum_{i=1}^p \delta_i GDP_{t-i} + \sum_{i=1}^p \varphi_i EMP_{t-i} + \sum_{i=1}^p \gamma_i TOP_{t-i} + \sum_{i=1}^p \psi FDI_{t-i} + \varepsilon_i \quad (3.6)$$

If there is evidence of a long-run relationship, the error correction model (ECM) is estimated, which indicates the speed of adjustment back to long-run equilibrium after a short-run disturbance. The standard ECM involves estimating the following equation:

$$\Delta LGDP = \beta_0 + \sum_{i=1}^p \alpha_1 \Delta LGDP_{t-i} + \sum_{i=1}^p \alpha_2 \Delta EMP_{t-i} + \sum_{i=1}^p \alpha_3 \Delta TOP_{t-i} + \sum_{i=1}^p \alpha_4 \Delta FDI_{t-i} + \lambda_1 ECM_{t-1} + \varepsilon_t \quad (3.7)$$

Where ECM_{t-1} is the error correcting term, the coefficient of this error term should be negative and statistically significant. This coefficient indicates the speed of adjustment, how quickly the variables return to long run equilibrium.

3.3 Diagnostic Test

To get reliable and valid results, this is to ascertain goodness of fit the ARDL model, diagnostic test and stability tests are conducted in which the diagnostic test will examine, normality, heteroscedasticity, serial correlation. These tests are important because errors might occur and these tests help deduce reliable and valid data. The stability test is conducted by employing the cumulative residual (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

4. FINDINGS OF THE STUDY

Prior to testing for cointegration, the augment Dicker Fuller (ADF) test and the Phillips-Perron (PP) test were used to test for stationarity and thus determine the order of integration of the variables. The results are illustrated in Table 4.1. The results for both ADF and PP show that we fail to reject the null hypothesis of unit root in the level form for all the variables. This implies all the variables have unit root. However, when the two tests are applied to the variables at the first difference, we can reject the null hypothesis of unit root. This means that the variables are stationary at first difference.

4.1 Unit root tests

	Levels		First difference	
Variable	ADF	PP	ADF	PP
GDP	-2.482	-1.740	-3.678**	-3.594**
EMP	-0.474	-0.593	-4.756**	-5.315**
TOP	-0.305	-1.968	-4.293***	-4.277***
FDI	-1.573	-5.294	-8.175**	-12.277**
Notes ‘***’, ‘**’, ‘*’ represents at 1%, 5% and 10% level of significance respectively				

Given that the variables are integrated of order one $I(1)$, we can proceed to examine whether the variables have a long run relationship or not. The ARDL bounds testing approach is used to determine whether the variables are cointegrated or not and the results are illustrated in Table 4.2. From Table 4.2, it can be deduced that there is a presence of a long run relationship between economic growth, trade openness, employment and foreign direct investments in Switzerland. This is on account that when economic growth is taken as the dependent variable, the F-statistics of economic growth (15.287) is greater than the upper critical bound value of 4.66 at 1 percent level of significance. This findings are consistent to the results of Manni and Afzal, Olufemi (2004) and Silva et.al (2014) for Bangladesh, Nigeria and South Africa.

4.2 Bounds test to Co-integration

	Value	K
F-statistic	15.28743	3
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10 %	2.37	3.2
5%	2.79	3.67
1%	3.65	4.66

4.3 Estimation Results of Long-run and Short-run Elasticities

Having established that there is an existence of cointegration among the variables, the next step involves estimating both the long run and short run ARDL models. The findings for the long run estimates are presented in Table 4.3. The results show that there is a positive and significant relationship between trade openness and economic growth in the long run. Specifically, a 1% increase in trade openness leads to a 1.86% increase in economic growth. This results are in line with the findings of Khobai et.al (2018); Keho and Wang (2017) and Hozouri (2016) for Nigeria and Ghana, Cote D'Ivoire, and 17 MENA countries, respectively. Foreign direct investment and employment also have a positive and significant effect on economic growth in the long run. Specifically, a 1% increase in employment and foreign direct investment boosts economic growth by 5.82% and 0.06%, respectively.

4.3 Long run

Variables	Coefficient	Std. Error	t-Statistic
D(LEMP)	5.819***	1.384	4.202
D(LFDI)	0.059***	0.059	4.110
D(LTOP)	1.859**	0.241	7.686
C	-64.086	12.985	4.935

Table 4.4 illustrates the short run results. It can be realised from Table 4.4 that trade openness and foreign direct investment have positive and significant effect on economic growth in the short run while employment has a negative and insignificant effect on economic growth. The

results further show that the error correction term (-0.81) is negative and significant at 5% level of significance, this implies that the results support the existence of a long run relationship among the variables. The results indicate that departure from long-term growth path due to a certain shock is adjusted by 81% each year.

4.4 Short run

Variable	Coefficient	t-statistic	Probability
ECM (-1)	-0.81	19,549	0.032
D(LGDP)(-1)	0,70	23.00	0.027
D(LTOP)	0.26	11,251	0.037
D(LEMP)	-6.58	-17.131	0.156
D(LFDI)	0.05	16,177	0.039
R-squared	0.999	AIC	-9.29
Adjusted R-squared	0.987	Schwarz criterion	-8.29
F-Statistic	83.503	Durban Watson stat	3.67

4.4 Short-run diagnostics

The diagnostic test comprises of normality, heteroscedasticity, serial correlation and the functional form. With reference to the diagnostic tests in Table 4.5 below, serial correlation exists, while there is no heteroscedasticity present. The results show that the error term is normally distributed.

Table 4.5: Diagnostic tests

Normality	0,648(0,723)
Serial correlation LM test (Breusch-Godfrey)	2.968(0.189)
Heteroskedasticity-ARCH	18,525(0.181)

The Normality test shows that the residuals are normally distributed because the p-value 90.723) is greater than the Jarque-Bera test (0.648) hence we fail to reject null hypothesis. The results also imply that there is no serial autocorrelation because the results show that the p-value is lower it has a correct functional form. The results also show that there is no

heteroscedasticity because the p-value is greater than $0.181 > 0.09$ we therefore accept null hypothesis.

4.5 Stability Tests

The cumulative sum (CUSUM) plot from the recursive estimation of the model indicates stability of long-run coefficients over the sample period, because the graph of cumulative sum (CUSUM) does not exceed the critical boundaries at a 5% level of significance. The cumulative sum of squares (CUSUM squares test) plot from recursive estimation of the model, also indicates that there is stability of long-run coefficients over the sample period, because the graph of cumulative sum of squares (CUSUM) does not exceed the critical boundaries at 5% level of significance. Hence the null hypothesis which states that the regression is correctly specified cannot be rejected as both plots remain in the critical bounds of 5 % level of significance.

Figure 2: Cusum test

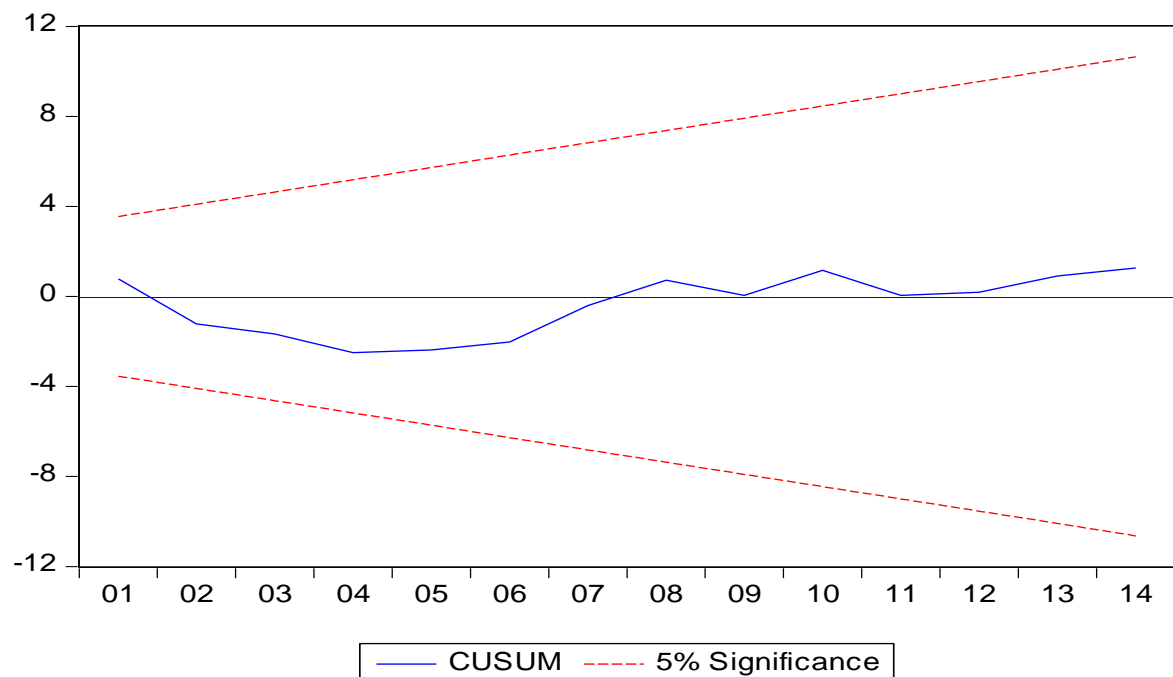
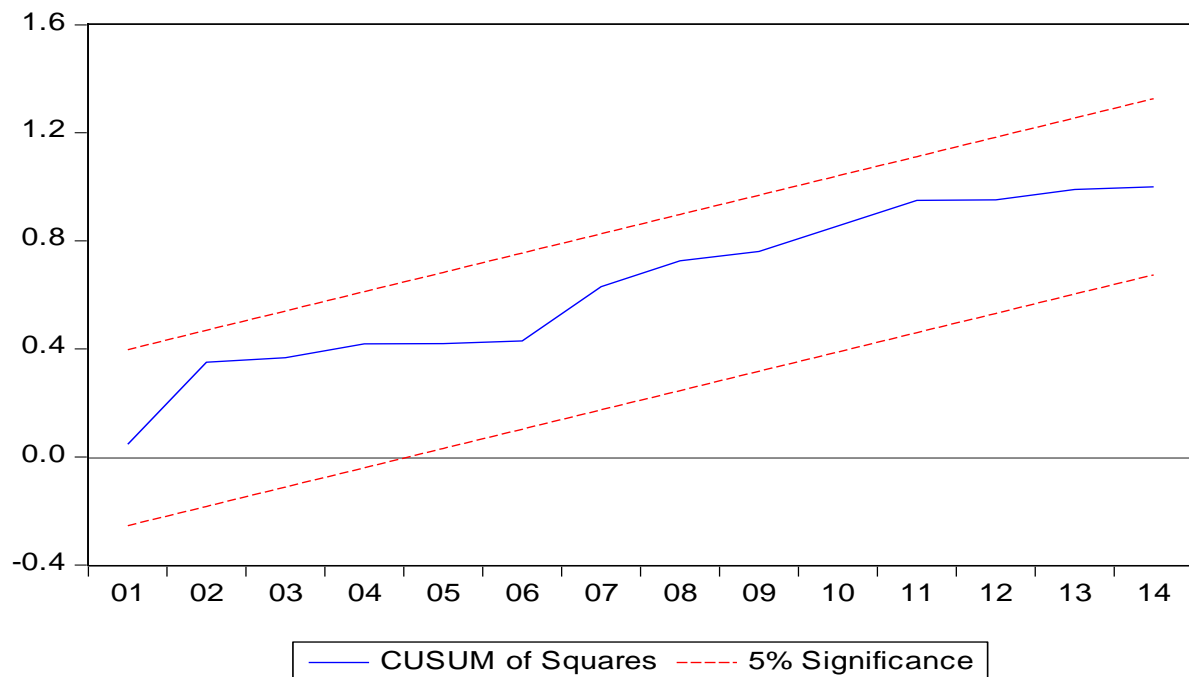


Figure 3: Cusum squares test



5. CONCLUSION

This study investigated the linkage between economic growth, trade openness, foreign direct investments and employment in Switzerland. The study employed the ADF and PP unit root tests to determine the stationarity of the variables. It also applied the ARDL bounds test approach to examine the presence of a long run relationship between the variables. The diagnostic tests were also carried out followed by the CUSUM and CUSUMSQ tests to test for the stability of the models.

The results suggested that all the variables are integrated of order one $I(1)$, meaning they are stationary at first difference. The ARDL bounds test revealed that there is a long run relationship between economic growth, trade openness, foreign direct investments and employment. It was further discovered that trade openness and foreign direct investments have positive and significant effect on economic growth both in the short run and long run while employment affects economic growth positively only in the long run. The error correction term (-0.81) was found to be negative and significant at 5% level of significance, which means that departure from long-term growth path due to a certain shock is adjusted by 81% each year. Finally, the CUSUM and CUSUMSQ stability tests proved that the coefficients of the Error Correction Model are stable because the plots of both curves lies within the 5% bounds.

Since our study evidenced the trade openness contributes to economic growth, it is recommended that the government and the policy makers should pursue the policies that will promote trade openness in Switzerland. This can be achieved by establishing multi-lateral and bilateral trade agreements that are favourable and ensuring environment that will support international trade and appropriate technology transfer.

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